

TABLE 6.2 POSTERIOR AXIOAPPENDICULAR MUSCLES

Muscle	Medial Attachment	Lateral Attachment	Innervation <sup>a</sup>	Main Action(s)
Superficial posterior thoracoappendicular (extrinsic shoulder) muscles				
Trapezius	Medial third of superior nuchal line; external occipital protuberance; nuchal ligament; spinous processes of C7–T12 vertebrae	Lateral third of clavicle; acromion and spine of scapula	Spinal accessory nerve (CN XI) (motor fibers) and C3, C4 (pain and proprioceptive fibers)	Descending (superior) part elevates; ascending (inferior) part depresses; and middle part (or all parts together) retracts scapula; descending and ascending parts act together to rotate glenoid cavity superiorly
Latissimus dorsi	Spinous processes of inferior 6 thoracic vertebrae, thoracolumbar fascia, iliac crest, and inferior 3 or 4 ribs	Floor of intertubercular sulcus (groove) of humerus	Thoracodorsal nerve (C6, C7, C8)	Extends, adducts, and medially rotates humerus; raises body toward arms during climbing
Deep posterior thoracoappendicular (extrinsic shoulder) muscles				
Levator scapulae	Posterior tubercles of transverse processes of C1–C4 vertebrae	Medial border of scapula superior to root of spine	Dorsal scapular (C5) and cervical (C3, C4) nerves	Elevates scapula and tilts its glenoid cavity inferiorly by rotating scapula
Rhomboid minor and major	Minor: nuchal ligament; spinous processes of C7 and T1 vertebrae Major: spinous processes of T2–T5 vertebrae	Minor: triangular area at medial end of scapular spine Major: medial border of scapula from level of spine to inferior angle	Dorsal scapular nerve (C4, C5)	Retract scapula and rotate it to depress glenoid cavity; fix scapula to thoracic wall

<sup>a</sup>The spinal cord segmental innervation is indicated (e.g., “C6, C7, C8” means that the nerves supplying the latissimus dorsi are derived from the sixth through eighth cervical segments of the spinal cord). Numbers in boldface (C6, C7) indicate the main segmental innervation. Damage to one or more of the listed spinal cord segments or to the motor nerve roots arising from them results in paralysis of the muscles concerned.

**TABLE 6.1** ANTERIOR AXIOAPPENDICULAR MUSCLES

Muscle	Medial Attachment	Lateral Attachment	Innervation <sup>a</sup>	Main Action(s)
<b>Pectoralis major</b>	<i>Clavicular head:</i> anterior surface of medial half of clavicle <i>Sternocostal head:</i> anterior surface of sternum, superior six costal cartilages, aponeurosis of external oblique muscle	Lateral lip of intertubercular sulcus (groove) of humerus	Lateral and medial pectoral nerves; clavicular head (C5, <b>C6</b> ), sternocostal head ( <b>C7, C8</b> , T1)	Adducts and medially rotates humerus; draws scapula anteriorly and inferiorly Acting alone, clavicular head flexes humerus and sternocostal head extends it from the flexed position
<b>Pectoralis minor</b>	3rd–5th ribs near their costal cartilages	Medial border and superior surface of coracoid process of scapula	Medial pectoral nerve (C8, T1)	Stabilizes scapula by drawing inferiorly and anteriorly against thoracic wall
<b>Subclavius</b>	Junction of 1st rib and its costal cartilage	Inferior surface of middle third of clavicle	Subclavian nerve ( <b>C5</b> , C6)	Anchors and depresses clavicle
<b>Serratus anterior</b>	External surfaces of lateral parts of 1st–8th ribs	Anterior surface of medial border of scapula	Long thoracic nerve (C5, <b>C6, C7</b> )	Protracts scapula and holds against thoracic wall; rotates scapula

<sup>a</sup>The spinal cord segmental innervation is indicated (e.g., “**C5**, C6” means that the nerves supplying the subclavius are derived from the fifth and sixth cervical segments of the spinal cord). Numbers in boldface (**C5**) indicate the main segmental innervation. Damage to one or more of the listed spinal cord segments or to the motor nerve roots arising from them results in paralysis of the muscles concerned.



TABLE 6.3 SCAPULOHUMERAL (INTRINSIC SHOULDER) MUSCLES

Muscle	Proximal Attachment	Distal Attachment	Innervation <sup>a</sup>	Main Action(s)
Deltoid	Lateral third of clavicle; acromion and spine of scapula	Deltoid tuberosity of humerus	Axillary nerve ( <b>C5</b> , C6)	Clavicular (anterior) part flexes and medially rotates arm; acromial (middle) part abducts arm; spinal (posterior) part extends and laterally rotates arm
Supraspinatus <sup>b</sup>	Supraspinous fossa of scapula	Superior facet } of greater tubercle of humerus Middle facet Inferior facet	Suprascapular nerve (C4, <b>C5</b> , C6)	Initiates and assists deltoid in abduction of arm and acts with other rotator cuff muscles <sup>b</sup>
Infraspinatus <sup>b</sup>	Infraspinous fossa of scapula		Suprascapular nerve ( <b>C5</b> , C6)	Laterally rotate arm; help hold humeral head in glenoid cavity of scapula
Teres minor <sup>b</sup>	Middle part of lateral border of scapula		Axillary nerve ( <b>C5</b> , C6)	
Teres major	Posterior surface of inferior angle of scapula	Medial lip of intertubercular groove of humerus	Lower subscapular nerve (C5, <b>C6</b> )	Adducts and medially rotates arm
Subscapularis <sup>b</sup>	Subscapular fossa (most of anterior surface of scapula)	Lesser tubercle of humerus	Upper and lower subscapular nerves (C5, <b>C6</b> , C7)	Medially rotates and adducts arm; helps hold humeral head in glenoid cavity

<sup>a</sup>The spinal cord segmental innervation is indicated (e.g., “**C5**, C6” means that the nerves supplying the deltoid are derived from the fifth and sixth cervical segments of the spinal cord). Numbers in boldface (**C5**) indicate the main segmental innervation. Damage to one or more of the listed spinal cord segments or to the motor nerve roots arising from them results in paralysis of the muscles concerned.

<sup>b</sup>Collectively, the supraspinatus, infraspinatus, teres minor, and subscapularis muscles are referred to as the rotator cuff, or SITS, muscles. Their primary function during all movements of the glenohumeral (shoulder) joint is to hold the humeral head in the glenoid cavity of the scapula.

TABLE 6.6 MUSCLES OF ARM

Muscle	Proximal Attachment	Distal Attachment	Innervation <sup>a</sup>	Main Action(s)
Biceps brachii	Short head: tip of coracoid process of scapula Long head: supraglenoid tubercle of scapula	Tuberosity of radius and fascia of forearm via bicipital aponeurosis	Musculocutaneous nerve <sup>b</sup> (C5, <b>C6</b> )	Supinates forearm and, when it is supinated, flexes forearm; flexes arm; short head resists dislocation of shoulder
Brachialis	Distal half of anterior surface of humerus	Coronoid process and tuberosity of ulna		Flexes forearm in all positions
Coracobrachialis	Tip of coracoid process of scapula	Middle third of medial surface of humerus	Musculocutaneous nerve (C5, <b>C6</b> , C7)	Helps flex and adduct arm; resists dislocation of shoulder
Triceps brachii	Long head: infraglenoid tubercle of scapula Lateral head: posterior surface of humerus, superior to radial groove Medial head: posterior surface of humerus, inferior to radial groove	Proximal end of olecranon of ulna and fascia of forearm	Radial nerve (C6, <b>C7</b> , <b>C8</b> )	Chief extensor of forearm; long head extends arm and resists dislocation of humerus (especially important during abduction)
Anconeus	Lateral epicondyle of humerus	Lateral surface of olecranon and superior part of posterior surface of ulna	Radial nerve (C7, C8, T1)	Assists triceps in extending forearm; stabilizes elbow joint; abducts ulna during pronation

<sup>a</sup>The spinal cord segmental innervation is indicated (e.g., “C5, **C6**” means that the nerves supplying the biceps brachii are derived from the fifth and sixth cervical segments of the spinal cord). Numbers in boldface (**C6**) indicate the main segmental innervation. Damage to one or more of the listed spinal cord segments or to the motor nerve roots arising from them results in paralysis of the muscles concerned.

<sup>b</sup>Some of the lateral part of the brachialis is innervated by a branch of the radial nerve.



TABLE 6.7 MUSCLES OF ANTERIOR COMPARTMENT OF FOREARM

Muscle	Proximal Attachment	Distal Attachment	Innervation <sup>a</sup>	Main Action
Superficial (first) layer				
Pronator teres (PT)	<i>Ulnar head:</i> coronoid process of ulna <i>Humeral head:</i> Medial epicondyle of humerus	Middle of convexity of lateral surface of radius	Median nerve (C6, <b>C7</b> )	Pronates and flexes forearm (at elbow)
Flexor carpi radialis (FCR)	Medial epicondyle of humerus	Base of 2nd (3rd) metacarpal		Flexes and abducts hand (at wrist)
Palmaris longus		Distal half of flexor retinaculum, palmar aponeurosis	Median nerve (C7, C8)	Flexes hand (at wrist) and tenses palmar aponeurosis
Flexor carpi ulnaris (FCU): Humeral head Ulnar head	Olecranon and posterior border (via aponeurosis)	Pisiform, hook of hamate, 5th metacarpal	Ulnar nerve (C7, <b>C8</b> )	Flexes and adducts hand (at wrist)

**TABLE 6.7** MUSCLES OF ANTERIOR COMPARTMENT OF FOREARM (*continued*)

Muscle	Proximal Attachment	Distal Attachment	Innervation <sup>a</sup>	Main Action
Intermediate (second) layer				
<b>Flexor digitorum superficialis (FDS)</b>	<i>Humero-ulnar head:</i> medial epicondyle of humerus and coronoid process of ulna <i>Radial head:</i> oblique line of radius	Shafts (bodies) of middle phalanges of medial four digits	Median nerve (C7, C8, T1)	Flexes proximal interphalangeal joints of middle four digits; acting more strongly, it also flexes proximal phalanges at metacarpophalangeal joints
Deep (third) layer				
<b>Flexor digitorum profundus (FDP)</b>	Proximal three quarters of medial and anterior surfaces of ulna and interosseous membrane	Bases of distal phalanges of 2nd, 3rd, 4th, and 5th digits	<i>Lateral part (to digits 2 and 3):</i> Median nerve ( <b>C8</b> , T1) (anterior interosseous branch) <i>Medial part (to digits 4 and 5):</i> Ulnar nerve (C8, <b>T1</b> )	Flexes distal interphalangeal joints of digits 2, 3, 4, and 5; assists with wrist flexion
<b>Flexor pollicis longus (FPL)</b>	Anterior surface of radius and adjacent interosseous membrane	Base of distal phalanx of thumb	Anterior interosseous nerve, from median nerve ( <b>C8</b> , T1)	Flexes phalanges of 1st digit (thumb)
<b>Pronator quadratus</b>	Distal quarter of anterior surface of ulna	Distal quarter of anterior surface of radius		Pronates forearm; deep fibers bind radius and ulna together

<sup>a</sup>The spinal cord segmental innervation is indicated (e.g., “C6, **C7**” means that the nerves supplying the pronator teres are derived from the sixth and seventh cervical segments of the spinal cord). Numbers in boldface (**C7**) indicate the main segmental innervation. Damage to one or more of the listed spinal cord segments or to the motor nerve roots arising from them results in paralysis of the muscles concerned.



**TABLE 6.8** MUSCLES OF POSTERIOR COMPARTMENT OF FOREARM

Muscle	Proximal Attachment	Distal Attachment	Innervation <sup>a</sup>	Main Action
Superficial layer				
<b>Brachioradialis</b>	Proximal two thirds of lateral supra-epicondylar ridge of humerus	Lateral surface of distal end of radius proximal to styloid process	Radial nerve (C5, <b>C6</b> , C7)	Relatively weak flexion of forearm, maximal when forearm is in midpronated position
<b>Extensor carpi radialis longus</b>	Lateral supra-epicondylar ridge of humerus	Dorsal aspect of base of 2nd metacarpal	Radial nerve (C6, C7)	Extend and abduct hand at the wrist joint; extensor carpi radialis brevis active during fist clenching
<b>Extensor carpi radialis brevis</b>	Lateral epicondyle of humerus (common extensor origin)	Dorsal aspect of base of 3rd metacarpal	Deep branch of radial nerve ( <b>C7</b> , C8)	
<b>Extensor digitorum</b>		Extensor expansions of medial four fingers	Posterior interosseous nerve ( <b>C7</b> , C8), continuation of deep branch of radial nerve	Extends medial four fingers primarily at metacarpophalangeal joints, secondarily at interphalangeal joints
<b>Extensor digiti minimi</b>		Extensor expansion of 5th finger		Extends 5th finger primarily at metacarpophalangeal joint, secondarily at interphalangeal joint
<b>Extensor carpi ulnaris</b>		Dorsal aspect of base of 5th metacarpal		Extends and adducts hand at wrist joint (also active during fist clenching)

**TABLE 6.8** MUSCLES OF POSTERIOR COMPARTMENT OF FOREARM (*continued*)

Muscle	Proximal Attachment	Distal Attachment	Innervation <sup>a</sup>	Main Action
Deep layer				
Supinator	Lateral epicondyle of humerus; radial collateral and anular ligaments; supinator fossa; crest of ulna	Lateral, posterior, and anterior surfaces of proximal third of radius	Deep branch of radial nerve (C7, <b>C8</b> )	Supinates forearm; rotates radius to turn palm anteriorly or superiorly (if elbow is flexed)
“Outcropping” muscles of deep layer				
Abductor pollicis longus	Posterior surface of proximal halves of ulna, radius, and interosseous membrane	Base of 1st metacarpal	Posterior interosseous nerve (C7, <b>C8</b> ), continuation of deep branch of radial nerve	Abducts thumb and extends it at carpometacarpal joint
Extensor pollicis longus	Posterior surface of middle third of ulna and interosseous membrane	Dorsal aspect of base of distal phalanx of thumb		Extends distal phalanx of thumb at interphalangeal joint; extends metacarpophalangeal and carpometacarpal joints
Extensor pollicis brevis	Posterior surface of distal third of radius and interosseous membrane	Dorsal aspect of base of proximal phalanx of thumb		Extends proximal phalanx of thumb at metacarpophalangeal joint; extends carpometacarpal joint
Extensor indicis	Posterior surface of distal third of ulna and interosseous membrane	Extensor expansion of 2nd finger		Extends 2nd finger (enabling its independent extension); helps extend hand at wrist

<sup>a</sup>The spinal cord segmental innervation is indicated (e.g., “**C7**, C8” means that the nerves supplying the extensor carpi radialis brevis are derived from the seventh and eighth cervical segments of the spinal cord). Numbers in boldface (**C7**) indicate the main segmental innervation. Damage to one or more of the listed spinal cord segments or to the motor nerve roots arising from them results in paralysis of the muscles concerned.



TABLE 6.11 INTRINSIC MUSCLES OF HAND

Muscle	Proximal Attachment	Distal Attachment	Innervation <sup>a</sup>	Main Action
Thenar muscles				
Opponens pollicis	Flexor retinaculum and tubercles of scaphoid and trapezium	Lateral side of 1st metacarpal	Recurrent branch of median nerve (C8, T1)	To oppose thumb, it draws 1st metacarpal medially to center of palm and rotates it medially
Abductor pollicis brevis		Lateral side of base of proximal phalanx of thumb		Abducts thumb; helps oppose it
Flexor pollicis brevis: Superficial head Deep head				Flexes thumb
Adductor pollicis:  Oblique head  Transverse head	Bases of 2nd and 3rd metacarpals, capitate, adjacent carpals  Anterior surface of shaft of 3rd metacarpal	Medial side of base of proximal phalanx of thumb	Deep branch of ulnar nerve (C8, T1)	Adducts thumb toward lateral border of palm
Hypothenar muscles				
Abductor digiti minimi	Pisiform	Medial side of base of proximal phalanx of 5th finger	Deep branch of ulnar nerve (C8, T1)	Abducts 5th finger; assists in flexion of its proximal phalanx
Flexor digiti minimi brevis	Hook of hamate and flexor retinaculum			Flexes proximal phalanx of 5th finger
Opponens digiti minimi		Medial border of 5th metacarpal		Draws 5th metacarpal anterior and rotates it, bringing 5th finger into opposition with thumb

**TABLE 6.11** INTRINSIC MUSCLES OF HAND (*continued*)

Muscle	Proximal Attachment	Distal Attachment	Innervation <sup>a</sup>	Main Action
Short muscles				
Lumbricals				
1 and 2	Lateral two tendons of flexor digitorum profundus (as unipennate muscles)	Lateral sides of extensor expansions of 2nd–5th fingers	Median nerve (C8, <b>T1</b> )	Flex metacarpophalangeal joints; extend interphalangeal joints of 2nd–5th fingers
3 and 4	Medial three tendons of flexor digitorum profundus (as bipennate muscles)		Deep branch of ulnar nerve (C8, <b>T1</b> )	
Dorsal interossei, 1–4	Adjacent sides of two metacarpals (as bipennate muscles)	Bases of proximal phalanges; extensor expansions of 2nd–4th fingers		Adduct 2nd, 4th, and 5th fingers toward axial line; assist lumbricals in flexing metacarpophalangeal joints and extending interphalangeal joints
Palmar interossei, 1–3	Palmar surfaces of 2nd, 4th, and 5th metacarpals (as unipennate muscles)	Bases of proximal phalanges; extensor expansions of 2nd, 4th, and 5th fingers		

<sup>a</sup>The spinal cord segmental innervation is indicated (e.g., “**C8**, T1” means that the nerves supplying the opponens pollicis are derived from the eighth cervical segment and first thoracic segment of the spinal cord). Numbers in boldface (**C8**) indicate the main segmental innervation. Damage to one or more of the listed spinal cord segments or to the motor nerve roots arising from them results in paralysis of the muscles concerned.